**COMMONWEALTH OF VIRGINIA**
**Department of Environmental Quality**
**Southwest Regional Office**

**STATEMENT OF LEGAL AND FACTUAL BASIS**

Virginia Electric & Power Company
Bellemeade Power Station
Glen Allen, Virginia
Permit No. PRO50988

Title V of the 1990 Clean Air Act Amendments required each state to develop a permit program to ensure that certain facilities have federal Air Pollution Operating Permits, called Title V Operating Permits. As required by 40 CFR Part 70 and 9 VAC 5 Chapter 80, Virginia Electric & Power Company has applied for a Title V Operating Permit for its Bellemeade Power Station located in Richmond, Virginia. The Department has reviewed the application and has prepared a Title V Operating Permit.

Engineer/Permit Contact: _____ Date: _____

Air Permit Manager: _____ Date: _____

Deputy Regional Director: _____ Date: _____

## FACILITY INFORMATION

| Permittee | Facility |
|---|---|
| Virginia Electric and Power Company | Bellemeade Power Station |
| 5000 Dominion Boulevard | 1860 Commerce Road |
| Glen Allen, Virginia 23060 | Richmond, Virginia 23224 |

AFS Facility ID No. 51-760-00389
ORIS Code: 50966

## SOURCE DESCRIPTION

SIC Code: 4911 - Electric Services (Establishments engaged in the generation, transmission, and/or distribution of electric energy for sale).

The Bellemeade Power Station is a 240 MW natural gas and distillate oil-fired electric power generating facility located in Richmond, Virginia. The facility is comprised of two (2) ASEA Brown Boveri (ABB) Type 11N combustion turbines rated at 1163.5 mmBtu/hr, and one (1) ABCO auxiliary boiler rated at 132.1 mmBtu/hr. The exhaust from both of the ABB combustion turbines is directed to a heat recovery steam generator (equipped with two 80 mmBtu/hr duct burners) which drives a 76 MW steam turbine generator. The facility also has a 50,000 gallon capacity distillate oil storage tank.

Units #1 and #2 were originally permitted in 1989 and are subject to 40 CFR 60 Subpart GG, *Standards of Performance for Stationary Gas Turbines*, and the duct burners are subject to 40 CFR 60 Subpart Dc, *Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units*. The ABCO auxiliary boiler is subject to 40 CFR 60 Subpart Db, *Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units*, and the distillate oil storage tank is subject to 40 CFR 60 Subpart Kb, *Standards of Performance for Volatile Organic Liquid Storage Tanks for Which Construction, Reconstruction, or Modification Commenced After July 23, 1984*.

The facility is a Title V major source due to the potential emissions of $NO_X$, $SO_2$, and CO. This source is located in an attainment area for all criteria pollutants. The facility is permitted under a Phase II Acid Rain Permit that is effective from January 1, 2003 through December 31, 2007.

## COMPLIANCE STATUS

The facility is inspected at least once each year and a formal site inspection was conducted on August 1, 2002. The source was found to be in compliance with all applicable requirements.

## EMISSION UNIT AND CONTROL DEVICE IDENTIFICATION

The emissions units at this facility consist of the following:

| Emission Unit | Stack No. | Emission Unit Description | Manufacturer and Date of Construction | Size / Rated Capacity |
|---|---|---|---|---|
| ES - 1A (gas)<br>ES - 1B (oil) | EP-1 | Unit 1 Combustion Turbine | Asea Brown Boveri Type 11 N | 1163.5 mmBtu/hr (gas)<br>1081.3 mmBtu/hr (oil) |
| ES - 2A (gas)<br>ES - 2B (oil) | EP-2 | Unit 2 Combustion Turbine | Asea Brown Boveri Type 11 N | 1163.5 mmBtu/hr (gas)<br>1081.3 mmBtu/hr (oil) |
| ES - 3A (gas)<br>ES - 3B (oil) | EP-3 | Unit 1 Combustion Turbine Duct Burners | John Zink Company | 80 mmBtu/hr |
| ES - 4A (gas)<br>ES - 4B (oil) | EP-4 | Unit 2 Combustion Turbine Duct Burners | John Zink Company | 80 mmBtu/hr |
| ES - 5A (gas)<br>ES - 5B (oil) | EP-5 | ABCO Auxiliary Boiler | Installed 1990 | 118.54 mmBtu/hr design Input<br>(132.1 mmBtu/hr max gas)<br>(128.1 mmBtu/hr max oil)<br>100,000 lb/hr Steam Output |
| ES-6 | EP-6 | Fuel Oil Day Tank | Fuel Oil Day Tank | 50,000 gallon capacity |
| ES-7 | EP-7 | Caterpillar Fuel Oil Day Tank | Fuel Oil Day Tank | 50,000 gallon capacity |

Pollution Control Devices

| Stack No./ Emission Unit No. | Control Equipment Description | Manufacturer and Date of Construction | Size/Rated Capacity | Pollutant |
|---|---|---|---|---|
| EP-1/CD-1 | Steam Injection | Asea Brown Boveri steam injection system | N/A | $NO_X$ |
| EP-2/CD-2 | Steam Injection | Asea Brown Boveri steam injection system | N/A | $NO_X$ |
| EP-1/CD-3 | SCR | Babcock - Hitachi dry catalytic NOx removal system | 82.6% design | $NO_X$ |
| EP-2/CD-4 | SCR | Babcock - Hitachi dry catalytic NOx removal system | 82.6% design | $NO_X$ |

**EMISSIONS INVENTORY**

The 2002 annual emissions (as reported in CEDS) are summarized in the following table:

| 2002 Pollutant Emissions (Plantwide Total) | |
|---|---|
| Pollutant | Tons Emitted |
| Criteria Pollutants | |
| $PM_{10}$ | 1.64 |
| VOC | 7.70 |

| 2002 Pollutant Emissions (Plantwide Total) | |
|---|---|
| Pollutant | Tons Emitted |
| $NO_X$ | 110.59 |
| $SO_2$ | 1.91 |
| CO | 67.52 |
| Lead | < 0.1 |
| Hazardous Air Pollutants (HAP's) | |
| THAP | < 1.0 |

## EMISSION UNIT APPLICABLE REQUIREMENTS

The regulatory requirements for the Bellemeade facility are embodied in the conditions of the NSR permit dated April 10, 2003, the Title IV permit effective from January 1, 2003 to December 31, 2007, and the $NO_X$ Allowance Budget Trading permit contained in Section X of the Title V permit. All Total Suspended Particulate (TSP) and Particulate Matter (PM) references are listed as PM (TSP). $PM_{10}$ is equal to PM (TSP) in all limits. The permit process set many of the present limitations in the original July 18, 1989 NSR permit and have been reduced in several cases to simplify the permit and reduce both short term and facility-wide emissions. Each permit condition has been compared with the applicable requirement and found to be the same or more stringent.

## FUEL BURNING EQUIPMENT

### ❑ ABB Combustion Turbines

#### Limitations

The ABB combustion turbine engines have the following applicable requirements from NSPS (40 CFR 60) Subpart GG:

- $NO_X$ Emissions - 40 CFR 60.332 (a)(1) and 9 VAC 5-50-410

$$STD = 0.0075 \times \frac{(14.4)}{Y} + F$$

where:

STD = Allowable $NO_x$ emissions (percent by volume at 15 percent oxygen and on a dry basis).
Y = Manufacturer's rated heat rate at manufacturer's rated peak load (kilojoules per watt hour), or actual measured heat rate based on lower heating value of fuel as measured at actual peak load for the facility. The value of Y shall not exceed 14.4 kilojoules per watt hour.
F = $NO_x$ emission allowance for fuel-bound nitrogen as defined in §60.332 (a)(3)

- $SO_2$ Emissions - 40 CFR 60.333 (a) and (b) and 9 VAC 5-50-410

  Allowable $SO_2$ emissions shall not exceed 0.015% by volume at 15% $O_2$ OR fuel sulfur content of not more than 0.8% by weight.

- Test Methods & Procedures - 40 CFR 60.335 (a), (b), and (c).

The ABB combustion turbine engines have the following applicable requirements from the NSR permit dated April 10, 2003:

- The two gas turbines are subject to 40 CFR, Part 60, Subpart GG, Standards of Performance for Stationary Gas Turbines. Virginia Power shall comply with all applicable provisions of said standards of performance.
  (9 VAC 5-50-410 Subpart GG and Condition 3 of the NSR permit.)

- Nitrogen oxide emissions from each gas turbine shall be controlled by steam injection followed by selective catalytic reduction. The emission control system shall be provided with adequate access for inspection.
  (9 VAC 5-50-260 and Condition 6 of the NSR permit.)

- The approved fuels for the turbines are natural gas and No. 2 distillate oil. A change in the fuels may require a permit to modify and operate.
  (9 VAC 5-80-1180, 9 VAC 5-170-160, and Condition 8 of the NSR permit.)

- Sulfur dioxide emissions from each gas turbine shall be controlled by limiting the sulfur content of the fuels. The average sulfur content of the natural gas to be burned in the gas turbines/HRSG duct burners shall not exceed 0.22 grains per 100 cubic feet at standard conditions. No.2 distillate oil fuel shall not contain more than 0.2% sulfur by weight.
  (9 VAC 5-50-260 and Conditions 7, 15, and 16 of the NSR permit.)

- The two gas turbines together shall consume no more than the quantity of fuel annually, calculated as the sum of each consecutive 12 month period, as follows:

  - Natural gas: $14{,}221 \times 10^6$ cubic feet at standard conditions maximum when used 100 percent throughout the year.

  - The annual quantity of natural gas ($NG_{GT}$) shall be reduced when No. 2 distillate oil is used according to the following formula:

    $$\text{Annual } NG_{GT} = 14{,}221 \times 10^6 \text{ std ft}^3 - \frac{\text{Gallons No. 2 distillate oil used in turbines}}{\text{6800.7 gallons per hour}} \times 974 \times 10^3$$

  - No. 2 distillate oil: $13{,}601 \times 10^3$ gallons maximum. It shall be reduced by an amount determined by the following formula:

    $$\frac{(\text{Annual } NG_{GT} - 12{,}273 \times 10^6) \times 6800.7}{974 \times 10^3}$$

  (9 VAC 5-80-1180 and Condition 11 of the NSR permit.)

- Combustion products from the operation of each gas turbine prior to treatment by SCR shall not exceed the limitations specified below:

| For Natural Gas Firing | | lbs/hr |
|---|---|---|
| PM (TSP) | | 0.6 |
| $PM_{10}$ | | 0.6 |
| $SO_2$ | | 0.7 |
| $NO_x$ | 42.0 ppmvd at 15 percent $O_2$ (1-hour average) | --- |
| VOC | | 0.7 |
| CO | | 28.0 |

| For Distillate Oil Firing | | |
|---|---|---|
| PM (TSP) | | 28.0 |
| $PM_{10}$ | | 28.0 |
| $SO_2$ | 38.3 ppmvd at 15 percent $0_2$ (1-hour average) | 226.0 |
| $NO_x$ | 65.0 ppmvd at 15 percent $0_2$ (1-hour average) | --- |
| VOC | | 8.0 |
| CO | | 28.0 |
| Lead | | 0.04 |

(9 VAC 5-50-260 and Condition 23 of the NSR permit.)

- Visible emissions from each gas turbine shall not exceed 20 percent opacity as determined by EPA Method 9 (reference 40 CFR 60, Appendix A), except as provided in 9 VAC 5-50-80 of State Regulations.
  (9 VAC 5-50-260 and Condition 28 of the NSR permit.)

**Monitoring & Recordkeeping:**

- The owner/operator of any stationary gas turbine using water injection to control $NO_X$ emissions shall install and operate a continuous monitoring system to monitor and record the fuel consumption and the ratio of water to fuel being fired in the turbine.
  (40 CFR 60.334 (a))

- The owner/operator shall monitor the sulfur content and the nitrogen content of the fuel being fired.
  (40 CFR 60.334 (b).

- Virginia Power shall install and operate continuous monitoring systems to monitor and record:

  - Nitrogen oxides concentration at each gas turbine/HRSG duct burner stack.
  - Oxygen (or carbon dioxide) concentration at each gas turbine/HRSG duct burner stack.

  All continuous monitoring systems shall comply with the requirements of 40 CFR, Part 60, Section 60.13.
  (9 VAC 5-50-40 and Condition 18 of the NSR permit)

- Virginia Power shall monitor the sulfur content of the distillate oil being fired in the combustion turbines in accordance with 40 CFR 60 Section 60.334(b). Records of all sample analysis reports indicating sulfur content of the distillate oil shall be maintained.
  (9 VAC 5-50-50, 9 VAC 5-80-110, 9 VAC 5-80-490, and Conditions 16 and 29 of the NSR permit issued April 10, 2003)

- Records of all sample analysis reports indicating sulfur content of the natural gas shall be maintained. An analysis of the sulfur content of the natural gas shall be conducted twice per annum during the first and third quarter of each calendar year. If any sulfur analysis indicates noncompliance with 40 CFR 60.333, the owner or operator shall notify the US

EPA Regional Office Air Division of such excess emissions and the custom fuel monitoring schedule shall be conducted weekly during the interim period when this custom schedule is being re-examined. A change in the fuel supply shall also cause a review of the custom fuel monitoring schedule. The content and format of such records shall be arranged with the Director, Piedmont Region. These records shall be available for inspection by the DEQ and shall be current for the most recent five years.
(9 VAC 5-50-50, 9 VAC 5-80-110, 9 VAC 5-80-490, and Conditions 15 and 29 of the NSR permit issued April 10, 2003)

- Virginia Power shall install and operate ammonia flow meter devices to measure and record the injection rate of ammonia to the selective catalytic reduction systems. These devices shall be maintained and calibrated according to the manufacturer's specifications.
(9 VAC 5-50-40, VAC 5-80-110 B, 9 VAC 5-80-490 B, and Condition 19 of the NSR permit issued April 10, 2003)

- The owner/operator of any stationary gas turbine using water injection to control $NO_X$ emissions shall install and operate a continuous monitoring system to monitor and record the fuel consumption and the ratio of water to fuel being fired in the turbine.
(40 CFR 60.334 (a))

**Streamlined Requirements:**

The following requirements for the gas turbines have been streamlined as indicated:

- 9 VAC 5-50-80 (Standard for Visible Emissions) is no more stringent than Condition 28 of the 4/10/03 NSR permit.

- The $NO_X$ emission limit in NSPS subpart GG (40 CFR 60.332 (a)(1)) is less restrictive than the emissions limit listed in Condition 23 of the 4/10/03 NSR permit.

- The $SO_2$ standard in NSPS subpart GG (40 CFR 60.333 (a)) of 150 ppm is less restrictive than the $SO_2$ emission limits listed in Condition 23 of the 4/10/03 NSR permit. The alternate limit of 0.8% sulfur by weight listed in 40 CFR 60.333 (b) is less restrictive than the fuel sulfur limits listed in Condition 7 of the 4/10/03 NSR permit.

## ❑ Duct Burners

### Limitations

The two 80 mmBtu/hr John Zink duct burners are subject to the requirements of NSPS (40 CFR 60) Subpart Dc. However, the duct burners are currently limited to natural gas combustion and therefore, only the recordkeeping requirements of Subpart Dc apply. If and when the duct burners are operated on distillate oil, the $SO_2$ and particulate (opacity) limits of Subpart Dc will apply. However, these NSPS limits are no more restrictive than the limits already contained in the NSR permit issued April 10, 2003. Therefore, compliance with the provisions of the NSR permit will assure compliance with the potential requirements of NSPS Subpart Dc.

The two 80 mmBtu/hr John Zink duct burners have the following applicable requirements from the NSR permit issued April 10, 2003:

- Nitrogen oxide emissions from each heat recovery steam generator (HRSG) duct burner set shall be controlled by steam injection followed by selective catalytic reduction. The emission control system shall be provided with adequate access for inspection.
  (9 VAC 5-50-260 and Condition 6 of the NSR permit.)

- The approved fuels for the HRSG duct burners are natural gas and No. 2 distillate oil. The duct burners shall only operate on natural gas until such time that a satisfactory opacity test is conducted using No. 2 distillate oil. A change in the fuels may require a permit to modify and operate.
  (9 VAC 5-80-1180 and Condition 8 of the NSR permit.)

- Sulfur dioxide emissions from the gas turbines/HRSG duct burners shall be controlled by limiting the sulfur content of the fuels. The average sulfur content of the natural gas to be burned in the HRSG duct burners shall not exceed 0.22 grains per 100 cubic feet at standard conditions. No.2 distillate oil fuel shall not contain more than 0.2% sulfur by weight.
  (9 VAC 5-50-260, 9 VAC 5-80-1180, and Conditions 7, 15, and 16 of the NSR permit.)

- The two duct burners together shall consume no more than the quantity of fuel annually, calculated as the sum of each consecutive 12 month period, as follows:
  - Natural gas: $504 \times 10^6$ cubic feet at standard conditions maximum when used 100 percent throughout the year.
  - The annual quantity of natural gas consumption shall be reduced when the permit is amended to allow satisfactory opacity testing of the duct burner on No. 2 distillate oil, then No. 2 distillate oil is used according to the following formula:

    $$\text{Annual } NG_{DB} = 504 \times 10^6 \text{ std ft}^3 - \frac{\text{Gallons No. 2 distillate oil used in duct burners}}{571.4 \text{ gallons per hour}} \times 77.5 \times 10^3$$

  - No. 2 distillate oil: $571 \times 10^3$ gallons maximum.

  (9 VAC 5-80-1180 and Condition 12 of the NSR permit)

- Emissions from the operation of each duct burner shall not exceed the limitations specified below:

| | | lbs/hr |
|---|---|---|
| For Natural Gas Firing | | |
| PM (TSP) | | 0.39 |
| $PM_{10}$ | | 0.39 |
| $SO_2$ | | 0.05 |
| $NO_x$ | 8.2 ppmvd at 15 percent $O_2$ (1-hour average) | --- |
| VOC | | 7.6 |
| CO | | 15.2 |
| For Distillate Oil Firing (only after permit amendment and satisfactory opacity testing) | | |
| PM (TSP) | | 3.1 |
| $PM_{10}$ | | 3.1 |
| $SO_2$ | 38.3 ppmvd at 15 percent $O_2$ (1-hour average) | 16.7 |
| $NO_x$ | 11.7 ppmvd at 15 percent $O_2$ (1-hour average) | --- |
| VOC | | 12.0 |
| CO | | 24.0 |
| Lead | | 0.0013 |

The $NO_x$ emissions from each stack when burning either natural gas or No. 2 oil shall not exceed 8.2 and 11.7 ppmvd at 15 percent $O_2$ respectively after exhaust gas treatment by SCR.
(9 VAC 5-50-260 and Condition 24 of the NSR permit)

- Visible emissions from each HRSG duct burner shall not exceed 20 percent opacity as determined by EPA Method 9 (reference 40 CFR 60, Appendix A), except as provided in 9 VAC 5-50-80 of State Regulations.
(9 VAC 5-50-260 and Condition 28 of the NSR permit.)

**Monitoring & Recordkeeping:**

- Virginia Power shall install and operate continuous monitoring systems to monitor and record:
  - Nitrogen oxides concentration at each gas turbine/HRSG duct burner stack.
  - Oxygen (or carbon dioxide) concentration at each gas turbine/HRSG duct burner stack.

  All continuous monitoring systems shall comply with the requirements of 40 CFR, Part 60, Section 60.13.
  (9 VAC 5-50-40 and Condition 18 of the NSR permit)

- If the duct burners are operated on distillate oil, a fuel certification shall be obtained from the fuel supplier with each shipment of oil.
(40 CFR 60.42c and 9 VAC 5-50-410)

- Virginia Power shall install and operate ammonia flow meter devices to measure and record the injection rate of ammonia to the selective catalytic reduction systems. These devices shall be maintained and calibrated according to the manufacturer's specifications.
(9 VAC 5-50-40, VAC 5-80-110 B, 9 VAC 5-80-490 B, and Condition 19 of the NSR permit issued April 10, 2003)

❑ **Auxiliary Boiler**

**Limitations**

- The auxiliary boiler is subject to 40 CFR, Part 60, Subpart Db, Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units. Virginia Power shall comply with all applicable provisions of said standards of performance
(9 VAC 5-50-410, Subpart Db and Condition 4 of the NSR permit)

- Sulfur dioxide emissions from the auxiliary boiler when combusting oil, shall not exceed 0.80 lb/mmBtu. Only the heat input supplied to the boiler from the combustion of oil is to be considered in this limitation.
(40 CFR 60.42b)

- Particulate matter emissions from the auxiliary boiler, when combusting oil, shall not exceed 0.10 lb/mmBtu heat input.
(40 CFR 60.43b)

- The exhaust gases from the auxiliary boiler when combusting oil shall not exhibit greater than 20% opacity (6-minute average), except for one 6-minute period per hour of not more than 27% opacity.
(40 CFR 60.43b)

- A continuous monitoring system for measuring the opacity of the auxiliary boiler emissions to the atmosphere shall be installed, calibrated, maintained, and operated and shall record the output of the system when the boiler is combusting oil.
  (40 CFR 60.48b)

- Nitrogen oxide emissions (expressed as $NO_2$) from the auxiliary boiler shall not exceed 0.10 lb/mmBtu heat input.
  (40 CFR 60.44b(a))

- A continuous monitoring system for measuring nitrogen oxides emissions from the auxiliary boiler shall be installed, calibrated, maintained, and operated and shall record the output of the system when the boiler is combusting oil.
  (40 CFR 60.48b)

- Nitrogen oxides emissions from the auxiliary boiler shall be controlled by using staged combustion and oxygen control (low excess air). The emission control system shall be provided with adequate access for inspection.
  (9 VAC 5-50-260 and Condition 6 of the NSR permit)

- The average sulfur content of the natural gas to be burned in the auxiliary boiler shall not exceed 0.22 grains per 100 cubic feet at standard conditions. Sulfur dioxide emissions from each gas turbine shall be controlled by limiting the sulfur content of the fuels. No. 2 distillate oil fuel shall not contain more than 0.2% sulfur by weight .
  (9 VAC 5-50-260, 9 VAC 5-80-1180, and Conditions 7, 15, and 16 of the NSR permit.)

- The auxiliary boiler shall consume no more than the quantity of fuel annually, calculated as the sum of each consecutive 12 month period, as follows:
  - Natural gas: $153.6 \times 10^6$ cubic feet at standard conditions maximum when used 100 percent throughout the year.
  - The annual quantity of natural gas shall be reduced when No. 2 distillate oil is used according to the following formula:

    Annual $NG_{AB}$ =

    $$153.6 \times 10^6 \text{ std ft}^3 - \frac{\text{Gallons No. 2 distillate oil used in boiler}}{915.0 \text{ gallons per hour}} \times 128.0 \times 10^3$$

  - No. 2 distillate oil: $366 \times 10^3$ gallons maximum in the numerator.
  - The quantity of natural gas allowed shall be increased by $128.0 \times 10^3$ cubic feet at standard conditions for every $974 \times 10^3$ cubic feet at standard conditions not burned in the gas turbines because of reduced gas consumption in the gas turbines. It shall be calculated according to the following formula:

    $$\text{NG Increase} = \frac{\text{Annual } NG_{GT} - \text{NG used by GT}}{974 \times 10^3} \times 128.0 \times 10^3$$

    and added to the quantity determined above. Any natural gas replaced by distillate oil in the gas turbines can not be allocated to the auxiliary boiler.
  - The quantity of fuel shall be increased by $128.0 \times 10^3$ cubic feet at standard conditions natural gas or 915.0 gallons distillate oil for every 6,800.7 gallons of

distillate oil not burned in the gas turbines (below the maximum limit determined above) because of reduced consumption of oil in the gas turbines.

The quantity(ies) shall be calculated according to the following formula:

$$\text{NG Increase} = \frac{FO_{GT} - \text{distillate oil used by GT}}{6800.7} \times 128.0 \times 10^3$$

and added to the quantity determined in above.

OR

$$\text{Oil Increase} = \frac{FO_{GT} - \text{distillate oil used by GT's}}{6800.7} \times 915.0$$

Any oil replaced by natural gas in the gas turbines cannot be allocated to the auxiliary boiler.

(9 VAC 5-80-1180 and Condition 13 of the NSR permit)

- The continuous monitoring data generated by the $NO_X$ monitor on the auxiliary boiler shall be used to determine compliance with the lbs/mmBtu emissions standard on a 30-day rolling average basis. All of the quality assurance requirements of Part 60, Appendix F shall apply to this monitor.
  (9 VAC 5-50-280 and 9 VAC 5-50-410, Subpart Db, Appendix F, and Condition 20 of the NSR permit)

- Emissions from the operation of the auxiliary boiler shall not exceed the limitations specified below:

| | lbs/mmBtu | lbs/hr |
|---|---|---|
| For Natural Gas Firing | | |
| PM (TSP) | 0.008 | 1.06 |
| $PM_{10}$ | $4.8 \times 10^{-3}$ (HHV) | 0.64 |
| $SO_2$ | $6.06 \times 10^{-4}$ (HHV) | 0.08 |
| CO | --- | 9.6 |
| VOC | --- | 1.06 |
| $NO_x$ | 0.10 (HHV) (see Note 1) | 13.3 |
| For No. 2 Distillate Oil Firing | | |
| PM (TSP) | 0.03 | 3.9 |
| $PM_{10}$ | $6.0 \times 10^{-3}$ (HHV) | 0.8 |
| $SO_2$ | 0.21 (HHV) | 26.5 |
| CO | --- | 10.0 (see Note 2) |
| VOC | --- | 1.03 |
| $NO_x$ | 0.12 (HHV) (see Note 1) | 15.4 |
| Lead | --- | $2.1 \times 10^{-3}$ |

Note 1: Compliance shall be determined from the $NO_X$ continuous monitoring data as stated in Condition 20 of the NSR permit.

Note 2: Compliance shall be determined on a consecutive 12 month average basis.

(9 VAC 5-50-410, 9 VAC 5-80-1180, and Condition 25 of the NSR permit)

- Visible emissions from the auxiliary boiler shall not exceed 20 percent opacity as determined by EPA Method 9 (reference 40 CFR 60, Appendix A), except as provided in 9 VAC 5-50-80 of State Regulations.
  (9 VAC 5-50-260 and Condition 28 of the NSR permit.)

**Monitoring & Recordkeeping:**

- Virginia Power shall install and operate continuous monitoring systems on the auxiliary boiler stack to monitor and record:
  - Opacity.
  - Nitrogen oxides concentration.
  - Oxygen (or carbon dioxide) concentration.

  All continuous monitoring systems shall comply with the requirements of 40 CFR, Part 60, Section 60.13.
  (9 VAC 5-50-40 and Condition 18 of the NSR permit)

- Virginia Power shall monitor the sulfur content of the distillate oil being fired in the combustion turbines in accordance with 40 CFR 60 Section 60.334(b). Records of all sample analysis reports indicating sulfur content of the distillate oil shall be maintained. (9 VAC 5-50-50, 9 VAC 5-80-110, 9 VAC 5-80-490, and Conditions 16 and 29 of the NSR permit issued April 10, 2003)

- Records of all sample analysis reports indicating sulfur content of the natural gas shall be maintained. An analysis of the sulfur content of the natural gas shall be conducted twice per annum during the first and third quarter of each calendar year. A change in the fuel supply shall also cause a review of the custom fuel monitoring schedule. The content and format of such records shall be arranged with the Director, Piedmont Region. These records shall be available for inspection by the DEQ and shall be current for the most recent five years.
  (9 VAC 5-50-50, 9 VAC 5-80-110, 9 VAC 5-80-490, and Conditions 15 and 29 of the NSR permit issued April 10, 2003)

**Streamlined Requirements:**

The following requirement for the auxiliary boiler has been streamlined as indicated:

- The $NO_X$ emission limit of 0.20 lb/mmBtu (HHV) listed in NSPS subpart Db (40 CFR 60.44b) is less restrictive than the emissions limits listed in Condition 25 of the 4/10/03 NSR permit.

- **Emergency Diesel Generator**

  - The emergency diesel electric generator shall not consume more than 6,136 gallons of No. 2 distillate oil per year, calculated as the sum of each consecutive 12 month period. (9 VAC 5-80-1180 and Condition 14 of the NSR permit)

  - The maximum sulfur content of the oil to be burned in the emergency diesel generator shall not exceed 0.2 percent by weight. Virginia Power shall maintain records of all sample analysis reports indicating sulfur content of the No. 2 distillate oil.
    (9 VAC 5-80-1180 and Condition 16 of the NSR permit.)

**50,000-GALLON DISTILLATE OIL STORAGE TANK**

- The 50,000 gallon No. 2 distillate oil storage tank is subject to 40 CFR, Part 60, Subpart Kb, Standards of Performance for Volatile Organic Liquid Storage Vessels. Virginia Power

shall comply with all applicable recordkeeping and reporting requirements of 40 CFR 60, Subpart Kb.
(9 VAC 5-50-410, Subpart Kb and Condition 5 of the NSR permit).

**FACILITY-WIDE REQUIREMENTS**

**!** If, for any reason, the affected facilities or related air pollution control equipment fails or malfunctions and may cause excess emissions for more than one hour, the owner must notify the Director, Piedmont Regional Office, within four (4) daytime business hours of the occurrence. In addition, the owner must provide a written statement, within 14 days, explaining the problem, corrective action taken, and the estimated duration of the breakdown/shutdown.
(9 VAC 5-80-250)

- Virginia Power shall provide sampling ports adequate for test methods applicable to each gas turbine/HRSG duct burner and auxiliary boiler including safe sampling platforms, safe access to platforms and utilities for sampling and testing equipment.
(9 VAC 5-50-30 F and Condition 10 of the NSR permit)

- Virginia Power shall maintain adequate storage/supply of ammonia consistent with the needs and requirements of the facility.
(9 VAC 5-50-40 E and Condition 17 of the NSR permit)

- Virginia Power shall install and operate ammonia flow meter devices to measure and record the injection rate of ammonia to the selective catalytic reduction systems. They shall be maintained and calibrated according to the manufacturer's specifications.
(9 VAC 5-50-40 and Condition 19 of the NSR permit)

- Aggregate annual emission limits of the following criteria pollutants shall not exceed the quantities specified below:

| | |
|---|---|
| PM (TSP) | 42.7 tons per year |
| $PM_{10}$ | 42.7 tons per year |
| $NO_X$ | 244.3 tons per year |
| CO | 247.1 tons per year |
| $SO_2$ | 220.3 tons per year |
| VOC | 58.5 tons per year |

Annual emissions of $NO_X$, $SO_2$, and CO shall be calculated as follows:

$$NO_X = \frac{1 - 0.805}{2 \times 10^9} \times (NG_{GT} \times 156 + NG_{DB} \times 103.2) + \frac{NG_{AB} \times 103.9}{2 \times 10^9}$$

$$+ \frac{1 - 0.805}{2 \times 10^6} \times (FO_{GT} \times 32.7 + FO_{DB} \times 14) + \frac{FO_{AB} \times 16.8}{2 \times 10^6}$$

$$SO_2 = \frac{1}{2 \times 10^9} \times [(NG_{GT} \times 0.72) + (NG_{DB} \times 0.65) + NG_{AB} \times 0.6]$$

$$+ \frac{1}{2 \times 10^6} \times (FO_{GT} \times 29.7 + FO_{DB} \times 29.2 + FO_{AB} \times 29.0)$$

$$CO = \frac{1}{2 \times 10^9} \times (NG_{GT} \times 26.3 + NG_{DB} \times 196 + NG_{AB} \times 75)$$

$$+ \frac{1}{2 \times 10^6} \times (FO_{GT} \times 3.82 + FO_{DB} \times 42 + FO_{AB} \times 10.9)$$

Where: $NG_{GT}$, $NG_{DB}$ and $NG_{AB}$ are the 12-month rolling averages of natural gas consumption in the gas turbines, duct burners and auxiliary boiler respectively.

$FO_{GT}$, $FO_{DB}$ and $FO_{AB}$ are the 12-month rolling averages of fuel oil consumption in the gas turbines, duct burners and auxiliary boiler respectively.

Emissions recorded and calculated by continuous emissions monitors meeting the requirements of 40 CFR 60 may be substituted for the nitrogen oxide equation.
(9 VAC 5-80-1180 and Condition 26 of the NSR permit)

- Toxic pollutant emissions from the operation of the gas turbines/HRSG duct burners and auxiliary boiler shall be limited by the fuel consumption limits in Conditions 11, 12, 13, and 14 of the NSR permit.
(9 VAC 5-60-330 and Condition 27 of the NSR permit)

- Virginia Power shall submit excess $NO_X$ and opacity emission reports to the Director, Piedmont Regional Office within 30 days after the end of each calendar quarter for which there are excess emissions as described in 40 CFR 60.49b (h) and (i). Details of the quarterly reports are to be arranged with the Director, Piedmont Region. If there are no excess opacity or $NO_X$ emissions during the calendar quarter, the permittee shall submit a report semiannually stating that no excess emission occurred during the semiannual reporting period. The initial quarterly report shall be submitted to the Director, Piedmont Region, postmarked by the 30$^{th}$ day of the end of the previous quarter, unless no excess emissions occur during that quarter. Each subsequent quarterly or semiannual report shall be postmarked by the 30$^{th}$ day following the end of the reporting period. All quarterly and semiannual monitoring reports shall conform to the Continuous Emission Monitoring System Report Format enclosed with this permit.
(9 VAC 5-50-50 C and Condition 21 of the NSR permit)

**Monitoring & Recordkeeping:**

- The monitoring data collected from the continuous monitors required by this permit may, at the discretion of the Board, be used as evidence of violation of the emission standards. Further, these monitors are subject to such data capture requirements and/or quality assurance requirements as may be deemed appropriate by the Board.
(9 VAC 5-50-40, 9 VAC 5-80-110, 9 VAC 5-80-490, and Condition 22 of the NSR permit issued April 10, 2003)

**!** The owners and operators of the source and each affected unit at the source must keep the following documents on site for a period of five (5) years from the date each is created (per 40 CFR Part 72.9):

- the certificate of representation for the designated representative;
- all emissions monitoring information, copies of all reports, compliance certifications, and other submissions and all records made or required under the Acid Rain Program;

- copies of all documents used to complete the Acid Rain permit application and any other submission under the Acid Rain Program or to demonstrate compliance with the requirements of the Acid Rain Program.

- Virginia Power shall retain records of all emission data and operating parameters required, to include process throughputs, by the terms of this permit and shall include record keeping and reporting requirements of applicable NSPS and 9 VAC 5-50-50 of State Regulations.
  (9 VAC 5-50-50, 9 VAC 5-80-110, 9 VAC 5-80-490, and Condition 29 of the NSR permit issued April 10, 2003)

**Testing:**

The permit does not require facility-wide source testing. A table of test methods has been included in the permit if testing is performed. The Department and EPA have authority to require testing not included in this permit, if necessary to determine compliance with an emission limit or standard.

## PHASE II ACID RAIN PERMIT

The Phase II Acid Rain Permit for this facility, issued pursuant to 9 VAC 5 Chapter 80, Part II, Article 3, *Acid Rain Operating Permits* (9 VAC 5-80-360 et seq), in effect from January 1, 2002 through December 31, 2007, is incorporated by reference into the Title V permit. A copy of the acid rain permit is attached to the Title V permit.

Emissions from the units at the Bellemeade Power Station may not exceed any allowances that it holds under its Title IV acid rain permit. No permit revision will be required for increases in emissions that are authorized by allowances acquired pursuant to Title IV of the Clean Air Act or 9 VAC 5-80-360, et. seq., provided that such increases do not require a permit revision under any other applicable requirement. The Bellemeade Power Station may hold any number of allowances authorized by its acid rain permit, but these allowances may not be used as a defense for a non-compliance with any other applicable requirement. Any allowance authorized by the acid rain permit must be accounted for according to procedures established under 9 VAC 5-80-360, et. seq. or under regulations pursuant to Title IV of the Clean Air Act. Nothing in the Title V permit may alter or affect the applicable requirements of the acid rain program pursuant to Title IV of the Clean Air Act. Should an applicable requirement of the Clean Air Act, or of this permit, be more stringent than an applicable requirement from state or federal regulations promulgated under Title IV of the Clean Air Act, both provisions will appear in the Title V permit and both will be enforceable by the Administrator of the U.S. EPA.
(40 CFR Part 70, section 70.6(a)).

**Testing:**

40 CFR Part 75 requires annual relative accuracy test audits (RATA) for each monitor or continuous monitoring system. A table of test methods has been included in the permit if additional testing is to be performed. The Department and EPA have authority to require testing not included in this permit, if necessary to determine compliance with an emission limit or standard.

## GENERAL CONDITIONS

The permit contains general conditions required by 40 CFR Part 70 and 9 VAC 5-80-110, that apply to all federal operating permit sources. These include requirements for submitting semi-annual monitoring reports and an annual compliance certification report. The permit also requires notification of deviations from permit requirements or any excess emissions, including those caused by upsets, within one business day.

## STATE-ONLY APPLICABLE REQUIREMENTS

The following Virginia Administrative Codes have specific requirements only enforceable by the State and have not been included in the Federal Operating Permit:

- 9 VAC 5-40-340, Standard for odor;
- 9 VAC 5-60-200, Emission Standards for Toxic Pollutants from Existing Sources (Rule 6-4) et. seq.; and,
- 9 VAC 5-60-200, Emission Standards for Toxic Pollutants from New and Modified Sources (Rule 6-5), et. seq.

## FUTURE APPLICABLE REQUIREMENTS

The Bellemeade facility may be subject to the proposed *National Emission Standards for Hazardous Air Pollutants for Stationary Combustion Turbines* (MACT YYYY) and the proposed *National Emission Standards for Hazardous Air Pollutants for Industrial/Commercial/Institutional Boilers and Process Heaters* (MACT DDDDD).

The fuel monitoring and testing requirements of NSPS Subpart GG are expected to be revised in the near future to provide additional options for demonstrating compliance with the subpart.

## INAPPLICABLE REQUIREMENTS

40 CFR 60.334(b)(2) specifies that the sulfur and nitrogen contents of a fuel supplied directly to the turbine (without intermediate storage) are to be determined and recorded daily. The nitrogen analysis requirement has been waived for natural gas (per the determination issued by R. Douglas Neeley, Chief, U.S. EPA Region 4, March 29, 2000, entitled "Alternative Testing and Monitoring for Combined Cycle System," Applicability Determination Index Control No. 000031). The natural gas sulfur analysis requirement has been modified by NSR permit Condition No. 29, which reduces the testing schedule to twice per annum (during 1$^{st}$ and 3$^{rd}$ quarters of each calendar year) so long as the analyses demonstrate compliance with 40 CFR 60.333.

## INSIGNIFICANT EMISSION UNITS

The insignificant emission units are presumed to be in compliance with all requirements of the Clean Air Act as may apply. Based on this presumption, no monitoring, recordkeeping or reporting will be required for these emission units in accordance with 9 VAC 5-80-110. The following emission units at the facility are identified in the application as insignificant emission units under 9 VAC 5-80-720:

| Emission Unit No. | Emission Unit Description | Pollutant Emitted (5-80-720 B.) | Rated Capacity ( 5-80-720 C.) |
|---|---|---|---|
| IS-2 | Emergency Fuel Oil Tank (Diesel) | VOC | 350 gal |
| IS-4 | Turbine Lube Oil System (Combustion Turbine Unit 1) | VOC | 4000 gal |
| IS-5 | Turbine Lube Oil System (Combustion Turbine Unit 2) | VOC | 4000 gal |
| IS-6 | Steam Turbine Lube Oil System & Hydraulic Oil System | VOC | 250 gal & 4000 gal |
| IS-7 | Oily Water Collection Sump | VOC | 7000 gal |
| IS-8 | Oily Water Separation Tank | VOC | 275 Gal |
| IS-9 | Kerosene Storage Tank (Model 358) | VOC | 100 gal |
| IS-10 | Maintenance Shop Degreaser | VOC | 20 gal |
| The regulatory citation for each of the insignificant activities is 9 VAC 5-80-720B - Insignificant due to emission levels. | | | |

**CONFIDENTIAL INFORMATION**

The permittee did not submit a request for confidentiality. All portions of the Title V application are available for public review.

**PUBLIC PARTICIPATION**

A public notice appeared in The Richmond Times Dispatch on Sunday, August 17, 2003 announcing a 30-day public comment period for this permit. No state borders are located within 50 miles of the Bellemeade facility, but Maryland was notified as an affected state. No comments or requests for a hearing were received from the public or EPA.